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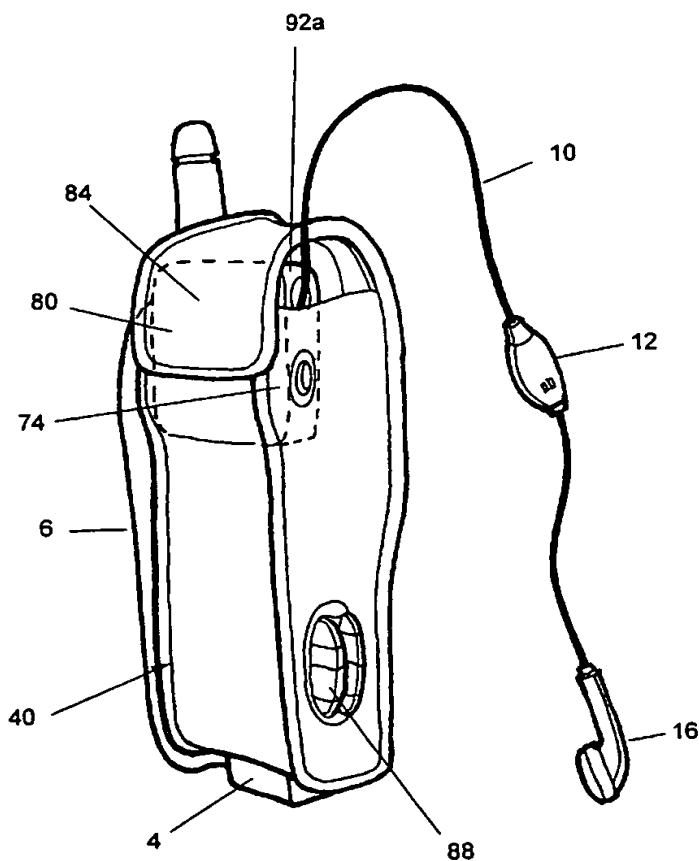
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(54) Title: **INTEGRATED HEADSET-CASE FOR WIRELESS PHONES**



(57) Abstract: An assembly comprised of a case (40) for protecting a mobile wireless phone (50) with a retractable headset device (14) installed in an integral pocket. Openings in the case are provided for extending a connector cable (6) that is plugged into the wireless phone, and for retractably extracting an earphone segment (10). The earphone cable segment is extracted for use when using the wireless phone in a hand-free scenario, and retracted when the assembly is to be stored.

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IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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Integrated Headset-Case for Wireless Phones

Background - Field of the Invention

The disclosed invention is classified as a means for storing and managing a
5 hands-free adapter that is used with various types of wireless and cordless phones.
Specifically, a variety of methods for attaching a spring-retractable headset or wireless
headset to a mobile wireless or cordless phone are described.

Background – Discussion of Prior Art

10 Advances in miniaturization and optimization of wireless transceiver
semiconductors, as well as innovation in digital signal processing have resulted in the
reduction of the cost of wireless phone hardware and service. At the same time, the
quality of wireless telephony in terms of both ubiquity of service and sound quality is
increasing. This cost reduction and simultaneous increase in quality is driving rapid
15 growth in the use of mobile wireless telephony. Users now commonly access wireless
telephony service in a wide variety of settings and environments including use in the
car, when walking or exercising, at work, and in the home. While wireless mobile
telephony is a great convenience, there is often the need to be able to use the service
while engaged in an activity that occupies the user's hands, such as while driving.
20 Hands-free adapters have been created that provide the ability to engage in
conversation while using the mobile wireless telephony system when driving. These
systems typically involve an external speaker and microphone system. Hands-free
headsets have been in use for some time that are comprised of a cable with a connector
at one end and an earphone and microphone assembly at the other end. These hands-
25 free headsets are popular because they allow the user to operate the mobile wireless
device without using the hands, and also maintain a private conversation. When using
the hands-free headset, the phone can be stored in a user's pocket or attached to the
belt with a belt-clip accessory. In addition to belt clips, there are other devices and
accessories that allow the user to attach the wireless phone to their body while the

phone is or is not in use. One popular accessory for wireless phones are fabric or leather soft cases FIG. 5 that protect the phone from abrasive damage while providing a belt clip, strap, or other attachment system.

Retractable headsets have been invented that allow the user to manually or
5 automatically retract headset cables into housings for the purpose of eliminating the tangling of headset cables. Wireless personal area network (PAN) systems have appeared that incorporate short range wireless communication transceivers such as Bluetooth technology, provided by Ericsson of Stockholm, Sweden. PAN systems allow for a wireless link between a wireless phone and the user's ear. With both the
10 PAN solution and the retractable headset solution, there remains the inconvenience for the user of having to manage another device in addition to the wireless phone. One solution to this problem is disclosed in U.S. patent 6,082,656 to Thornton, showing a retractable headset that is permanently incorporated into the wireless phone housing. However, headset cables often become snagged and are otherwise in harms way and
15 can be damaged to the point of inoperability. If the headset cable were to cease to function, the phone itself would have to be sent for repair which would greatly inconvenience the user. Furthermore, the size of the mobile phone is permanently increased by the integration of the retraction device. U.S patent 5,832,089 to Chen shows a retractable that is attachable to a wireless phone with a plastic bracket. This
20 attachment scheme requires a separate piece of hardware to further attach the wireless phone to the user's body. Furthermore, this attachment scheme does not serve to protect the user's phone from damage, and is not operable with a case that substantially covers and protects the user's phone housing. In order to implement this design, there must be sufficient mechanical attachment features on the phone. Since there are a
25 number of phone manufacturers in the market, this solution may not be viable for many or all of the various phone models.

What is needed is an integrated solution that provides for convenient hands-free capability for mobile wireless phone users that doesn't result in the need to physically keep track of a device in addition to the mobile wireless phone.

Summary of Invention

The present invention exemplifies a new and unobvious art of an integrated headset case. Briefly and generally, the integrated headset case provides for the ability
5 to removably couple a hands-free earphone/microphone solution to a mobile wireless phone. A hands-free headset device, such as a retractable headset device is integrated into a protective covering case for a wireless phone.

Objects And Advantages

- 10 Accordingly, several objects and advantages of the present invention are:
- (a) to provide an attachment of a hands-free solution to a mobile wireless phone that simultaneously provides a protective covering for the phone.
 - (b) to provide an attachment of a hands-free solution to a mobile wireless phone that simultaneously incorporates a means for attaching the phone to the user.
 - 15 (c) To provide a means for attaching a hands-free solution to a mobile wireless phone that does not require specific mechanical attachment features on the phone.

20 LIST OF DRAWING FIGURES

- FIG.1 shows a conventional headset cable.
- FIG.2 shows an isometric view of the retractable headset.
- FIG.3 shows an exploded view from above of a retractable headset mechanism.
- FIG.4 shows an exploded view from below of a retractable headset mechanism.
- 25 FIG.5 shows a variety of soft cases for wireless (cellular) phones.
- FIG.6 shows an isometric view of a retractable mechanism integrated with a soft case.
- FIG.7 shows an isometric view of a retractable mechanism integrated with a soft case with the earphone attached.

FIG.8 shows a section view of a retractable mechanism integrated with a soft case.

FIG.9 shows a view of a minimal pocket for holding the retractable mechanism.

FIG.10 shows a view of a minimal pocket for holding the retractable mechanism.

FIG.11 shows a soft case with a transparent attachment strap.

5 FIG.12 shows an isometric view of a sewn pocket with a cup strap and a strap.

FIG.13 shows a rear isometric view of a sewn pocket with a cup strap and a strap.

FIG.14 shows a wireless headset device installed in the integrated headset case.

10 Description of Preferred Embodiment

1. Describe existing non-retracting headset assembly.

FIG. 1 shows a conventional headset cable assembly 10. Headset cable assemblies 10 such as these are used with cordless and wireless phones 50. Headset cable
15 assembly 10 typically includes an earphone 16, and a microphone 12. These components are connected mechanically and electrically by the headset cable 8. Headset cable 8 is a plastic-coated, wound assembly of conductors and insulators such that earphone 16 and microphone 12 are functionally connected to a connector 4, which is plugged into a wireless phone 50. Headset cable assemblies 10 are used by
20 plugging connector 4 into a receptacle in wireless phone 50, and placing earphone 16 in a user's ear. Microphone 12 captures the user's speech because it is spaced away from earphone 16 such that it is in proximity to the user's mouth. Earphone 16 and microphone 12 may be in separate housings, such as the design shown in FIG. 1, or they may be integrated into one single housing, such as the design shown in FIG. 9.
25 The design and manufacture of headset cable assemblies 10 such as that shown in FIG. 1 are well known in the field of mobile wireless communications and will not be addressed here in further detail.

2. Describe retracting headset assembly.

FIG. 2 shows an automatically retractable headset device 14 for automatically rewinding headset cable assembly 10. A connector cable segment 6 with connector 4 attached non-retractably extends from one opening. An earphone cable segment 10 with microphone 12 and earphone 16 extends from a second opening. FIG. 3 and FIG. 4 show alternate exploded views of retractable headset device 14, including a top housing 24 and a bottom housing 28 that contain and constrain a slip-ring mechanism for maintaining constant electrical continuity of the circuits in connector cable segment 6 and earphone cable segment 10 regardless of the rotational position of the spool 40.

Top housing 24, bottom housing 28, spool 40, and the release button 44 are manufactured by injection-molding plastic. A printed-circuit board 52 is positioned next to bottom housing 28 and includes the three circular, concentric, conductive traces 60a, b, and c. Each of three conductive traces 60 are further connected by conductive traces to connector wire solder connections 68a, b, and c that are soldered to corresponding circuits in connector cable segment 6. A power spring 32 is used to drive spool 40 to rotate relative to top housing 24 and bottom housing 28 such that earphone cable segment 10 is wound on spool 40. The three spring wiper contacts 56a, b, and c are attached to spool 40 and aligned so that when spool 40 rotates, spring wiper contacts 56a, b, and c are always in conductive contact with corresponding concentric conductive traces 60a, b, and c. The corresponding three circuits on the earphone cable segment 10 terminate at spring wiper contacts 56a, b, and c. A ratchet-lock system is controlled by release button 44 that is externally accessible to the user. Spool 40 includes the ratchet teeth 36 that engage with a ratchet arm 38 when earphone cable segment 10 is released by the user, prohibiting spool 40 from rotating. Release button 44 pivots about a release button pivot 46 captured between top housing 24 and bottom housing 28. Ratchet arm 38 is forced to engage with ratchet teeth 36 by button return spring 48. Likewise, when the user pulls on earphone cable segment 10 to extract it, the angle of ratchet arm 38 allows it glide over ratchet teeth 36 without engaging.

Thus, there is a constant electrical connection made between the functional circuits connected to earphone 16 and microphone 12, and the corresponding contacts at connector 4, regardless of where spool 40 is rotationally positioned. The ratchet-lock system allows spool 40 to be stopped and fixed at practically any point in the rotation of spool 40, that is, the user can extract any length of earphone cable segment 10 and earphone cable segment 10 will stay fixed at that extraction length until release button 44 is pressed to release the ratchet-lock system. Slip-ring designs such as the one described herein are well known in the field of electrical and mechanical design, and specifically, in retractable headset design. With the knowledge that is in the public domain, combined with that included in this disclosure, it would be possible for one skilled in the art of headset design to implement a functional unit.

3. Describe phone case design.

FIG. 5 shows a variety of soft cases that are commonly available. These cases FIG. 5 are manufactured by sewing together cut materials such as leather, nylon fabric and include leather cases 18 with belt clips 98, leather or nylon fabric cases with transparent film faces 22, and neoprene cases 26. FIG. 5 also shows a flip-type case 30 for wireless phone 50. FIG. 6 and FIG. 8 show an integrated case 40 with retractable headset device 14 installed in a pocket 84. Integrated case 40 is manufactured by sewing together cut sections of two-way stretchable woven nylon fabric. Integrated case 40 is constructed so that it is open at the top so that wireless phone 50 can be inserted. A flap 80 that is part of integrated case 40 is pulled over the top of wireless phone 50 and secured with Velcro 96. This type of construction and manufacturing method is well known in the accessory cover or case design field. FIG. 8, a section view, shows that internal pocket 84 is sewn onto the rear inside surface of integrated case 40. FIG. 6 shows that pocket 84 is a square section of fabric. Pocket 84 is sewn onto integrated case 40 along the bottom and side edges, is open at the top, and is sized so that retractable headset device 14 can be easily fit into pocket 84 with minimal

stretching of pocket 84. It should be noted that pocket 84 could also be sewn against the outside rear surface of integrated case 40.

FIG. 6 and FIG. 7 further show that the construction of integrated case 40 with flap 80 over the top, allows for a cable outlet 92a opening so that earphone cable segment 10 can extend outside of integrated case 40. Connector cable segment 6 extends through a cable outlet 92b on the other side of integrated case 40. Connector cable segment 6 is shown in FIG. 6 and FIG. 7 as extending down the side of integrated case 40, where it terminates in connector 4 that is plugged into wireless phone 50. Integrated case 40 further includes a release button access hole 74 that provides access to release button 44 when retractable headset device 14 is installed in integrated case 40. FIG. 7 shows that a molded plastic earphone holder 88 is sewn onto the side of integrated case 40. Earphone holder 88 includes a gap feature that is sized so that the narrow stem of earphone 16 can be fixedly placed into the gap. Earphone holder 88 securely holds earphone 16 when earphone cable segment 10 is fully retracted, as shown in FIG. 7.

Integrated case also includes a belt clip 98, designated by the dotted line in FIG. 6. Belt clip 98 is not shown in detail because the use and design of this feature is well known and so as not to obscure present invention.

Although the description above contains many specificities, these should not be construed as limiting the scope of the invention, but merely providing illustration of some of the presently preferred embodiments of this invention. FIG. 9 and FIG. 10 show a design for a minimal pocket 84 that contains the retractable headset device 14 when the pocket 84 is attached to the wireless phone 50. In this embodiment, the pocket 80 is constructed out of a two-way stretchable nylon fabric. There is a rigid backing plate 120 that the strap 100 and the stretchable fabric are attached to. This rigid backing plate 120 is a flat or slightly curved plastic sheet made by injection-molding or thermo-forming plastic. There is a strap 100 that is fed through a metal loop 104 and pulled back onto itself so that the strap 100 may be pulled tight against the wireless phone 50. The strap 100 is secured with Velcro 96 against itself. The

strap 100 is a woven non-stretchable fabric such as woven nylon strapping. There may also be an elastomeric strip 116 along the inside of the strap 100 so that when the strap 100 is pulled tight, there is a large amount of friction between the inside of the strap 100 and the wireless phone 50. This friction prohibits the pocket 84 system from
5 sliding off of the wireless phone 50.

FIG. 11 shows a minimal pocket 84 design that incorporates a wider strap 100 with a transparent film 108 section that allows visual access to the wireless phone 50 display. The wider strap 100 allows for secure attachment.

FIG. 11 shows a design where the pocket 84 and integrated case 40 are one
10 homogeneous injection-molded part. The material is an injection-moldable elastomer such as Dynaflex, manufactured by GLS Corporation of McHenry, Illinois. The design in FIG. 11 may or may not include a plastic transparent film 108 that covers the wireless phone 50 display. The advantage of having the sheet is that the display is protected from being scratched. The transparent film 108 sheet also increases the
15 stiffness of the elastomeric straps 100 that wrap around the wireless phone 50. In this embodiment where the elastomeric straps 100 fix the integrated case 40 to the wireless phone 50, the length of each of the elastomeric strap 100 portions of the design is shorter than the total outer section distance around the wireless phone 50. Therefore the elastomeric straps 100 must be stretched around the wireless phone 50 and fact that
20 they are made of a higher friction elastomeric material, means that the friction of the straps 100 against the phone is high and this prohibits the pocket and integrated case 40 from slipping off of the wireless phone 50. In the integrated case 40 embodiments disclosed in FIG. 9 through FIG. 12, the retractable headset device 50 is designed with the release button 44 configured on the top of the device, so that the release button
25 access hole 74 in the side of the pocket 84 would not be required.

FIG. 14 shows a wireless hands-free headset device 54 installed in integrated case 40. A wireless hands-free headset device 54 is a system that includes a wireless communication link 132 between a base transceiver 124 and an integrated earphone/microphone module 128. This wireless communication link 132 could be a

Bluetooth system as described above, or it could be a 900Mhz system that is commonly used in cordless phone systems. Both the base transceiver 124 and the earphone/microphone module 128 contain a battery power supply. The base transceiver 124 includes a connector cable segment 6 that plugs into the headset port
5 on the wireless phone 50. The wireless hands-free headset device 54 is a two-way communication system that functions like a hands-free headset except with no cable. The operation of short range wireless systems such as this are known in the field of wireless communication and will not be described here in detail.

It should be noted that the disclosed invention of an integrated headset case can
10 be implemented with audio headphones rather than a headset with an earphone and a microphone. An integrated headphone case with a retractable headphone device can be implemented for use with portable audio playback devices such as MP3 players, mini-disk players, AM/FM radios, and CD players without departing from the new and unobvious art disclosed above.

15 Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.

I claim:

1. A case for an electronic device comprising in combination,
a removable pliable cover,
a pocket for removably containing a hands-free device,
5 an opening in said cover for accessing said hands-free device earphone and
connector.
2. The electronic device in claim 1 wherein said device is a wireless phone and said
earphone assembly includes a microphone.
- 10 3. The case in claim 1 wherein said pliable cover includes a flap for covering an
opening through which a wireless phone is installed.
4. The case in claim 1 where said pliable cover includes an opening for accessing a
15 release button.
5. The case in claim 1 wherein said hands-free device is a wireless headset.
6. The electronic device in claim 1 wherein said device is a portable audio playing
20 device and said hands-free device is a stereo headphone. |
7. The removable pliable cover in claim 1 wherein said cover includes a belt clip.
8. The removable pliable cover in claim 1 wherein said cover is fabricated out of
25 leather.
9. The removable pliable cover in claim 1 wherein said cover is injection-molded out
of elastomeric material.

10. The removable pliable cover in claim 1 wherein said cover is comprised of segments of two-way stretchable nylon fabric.
11. A method for using a hands-free device with an electronic device:
- 5 a. Covering a electronic device with a pliable case.
- b. Installing a retractable headset device in a pocket in said pliable case.
- c. Extracting an earphone cable segment from said retractable device.
- d. Listening to the audible output of said earphone cable segment.
- 10 12. The electronic device in claim 11 wherein said electronic device is a wireless phone and said earphone assembly includes a microphone.
13. The case in claim 11 wherein said pliable cover includes a flap for covering an opening through which a wireless phone is installed.
- 15 14. The case in claim 11 wherein said pliable cover includes an opening for accessing a release button.
15. The case in claim 11 where in said hands-free device is a wireless headset.
- 20 16. The electronic device in claim 11 wherein said device is a portable audio playing device and said hands-free device is a stereo headphone.
17. The removable pliable cover in claim 11 wherein said cover is fabricated out of leather.
- 25 18. The removable pliable cover in claim 11 wherein said cover is injection-molded out of elastomeric material.

19. The removable pliable cover in claim 11 wherein said cover is comprised of segments of two-way stretchable nylon fabric.
20. A system for using a mobile wireless phone without holding said phone in close
5 proximity to the ear, comprising in combination,
a portable wireless phone,
a pliable case for covering said wireless phone,
a pocket integral to said case with openings for extending a connector segment
and an earphone cable segment,
10 a retractable headset device for listening to the audible output of said wireless
phone, where said retractable device is placed in said pocket.

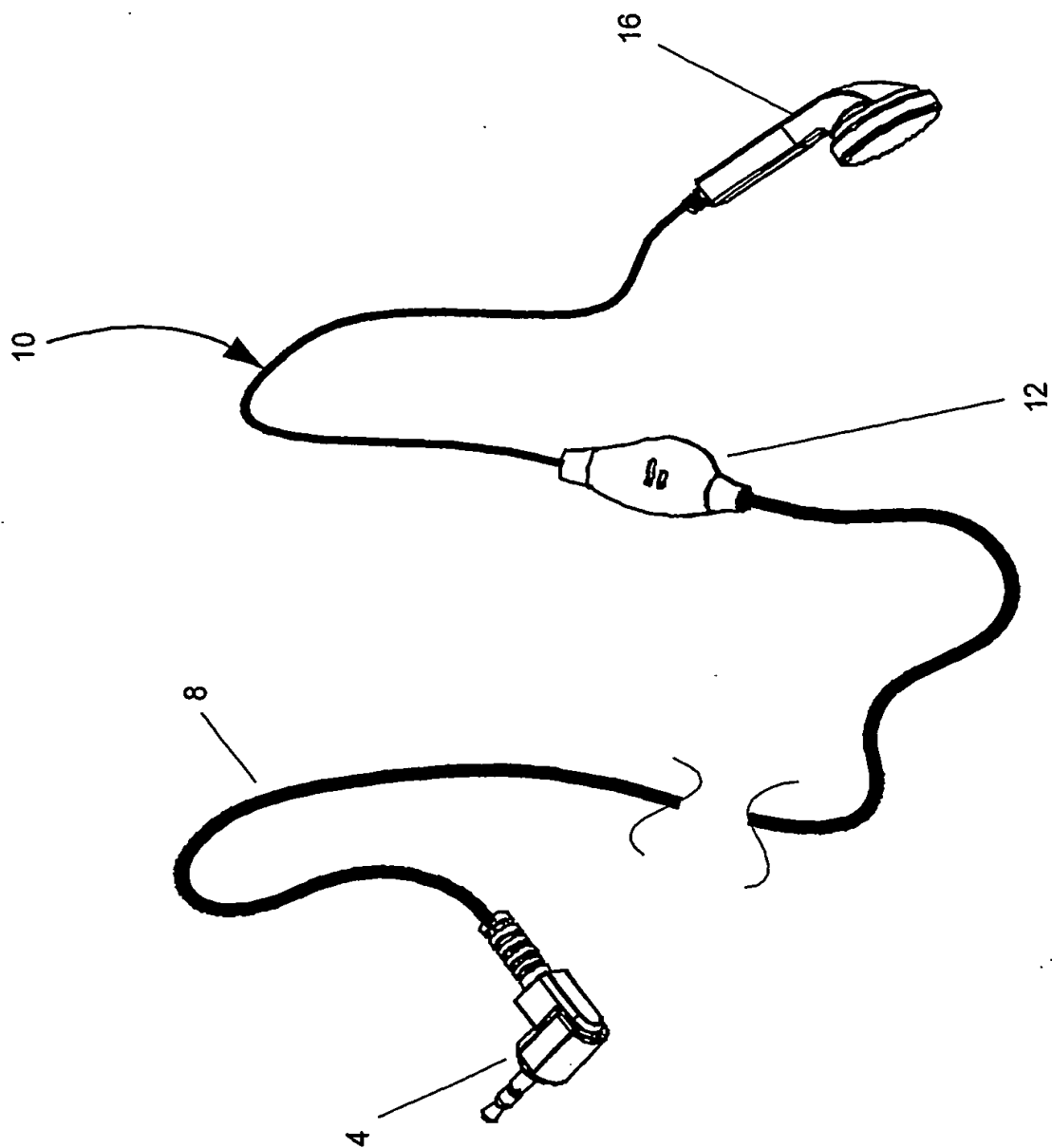


FIG. 1

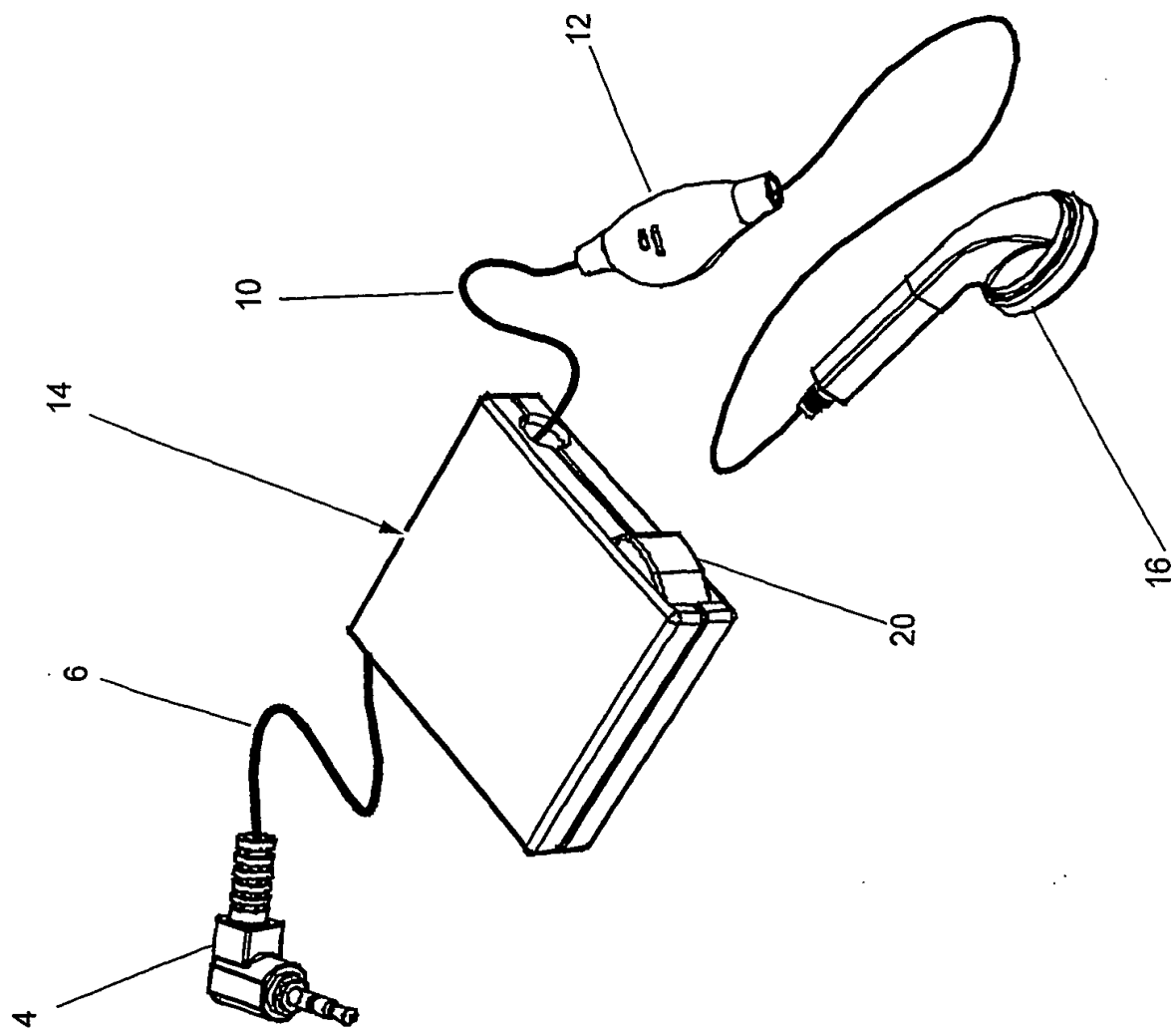
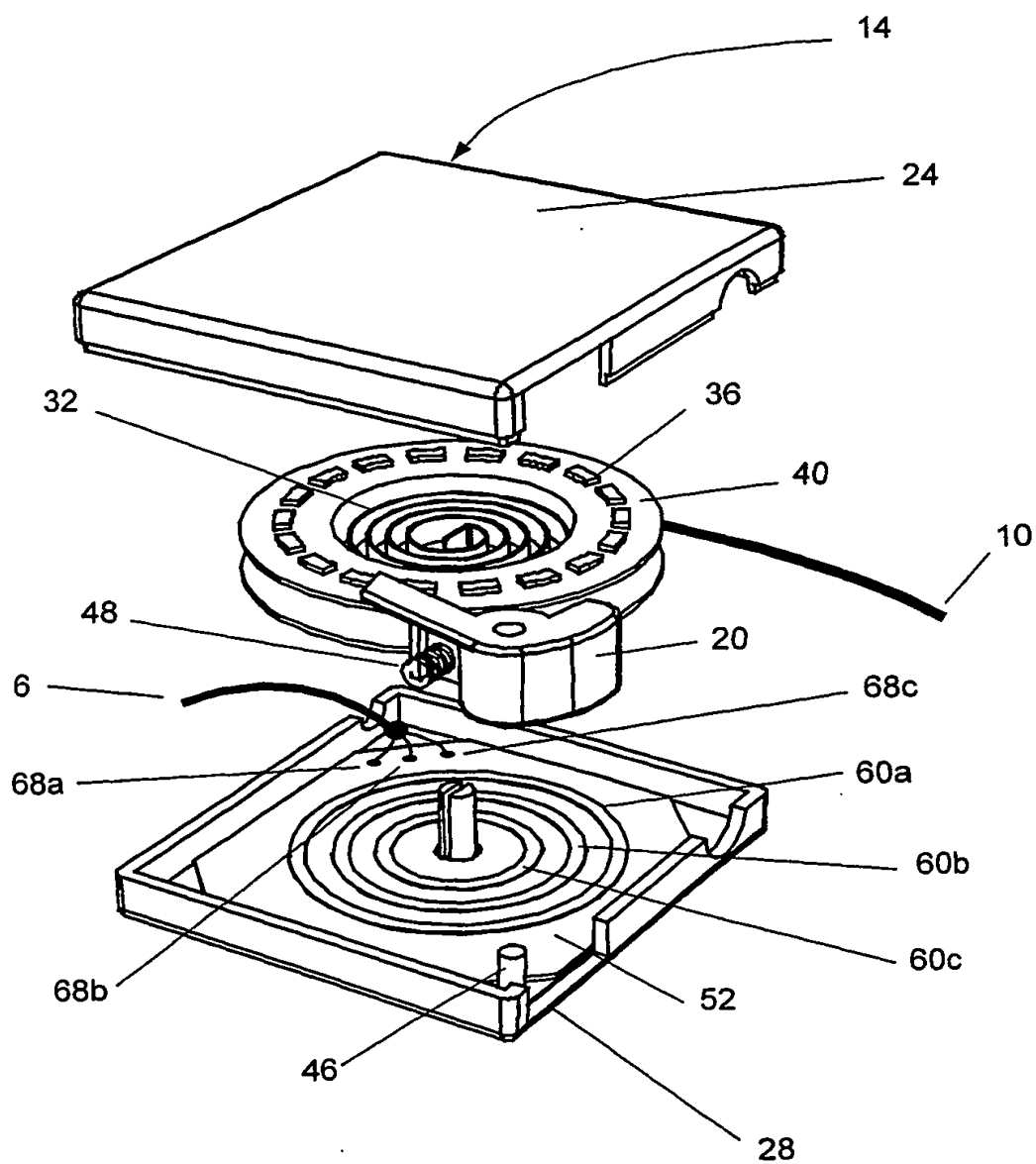


FIG. 2

**FIG. 3**

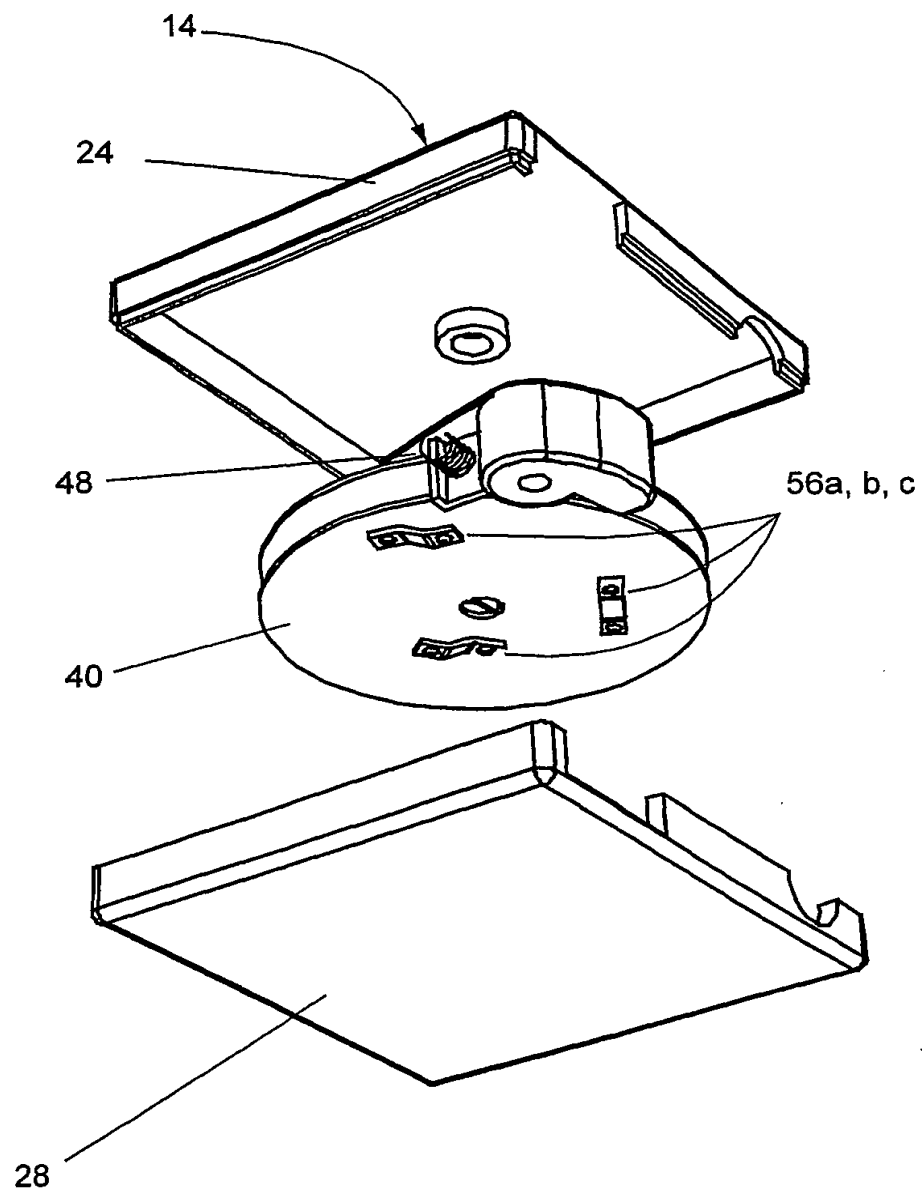
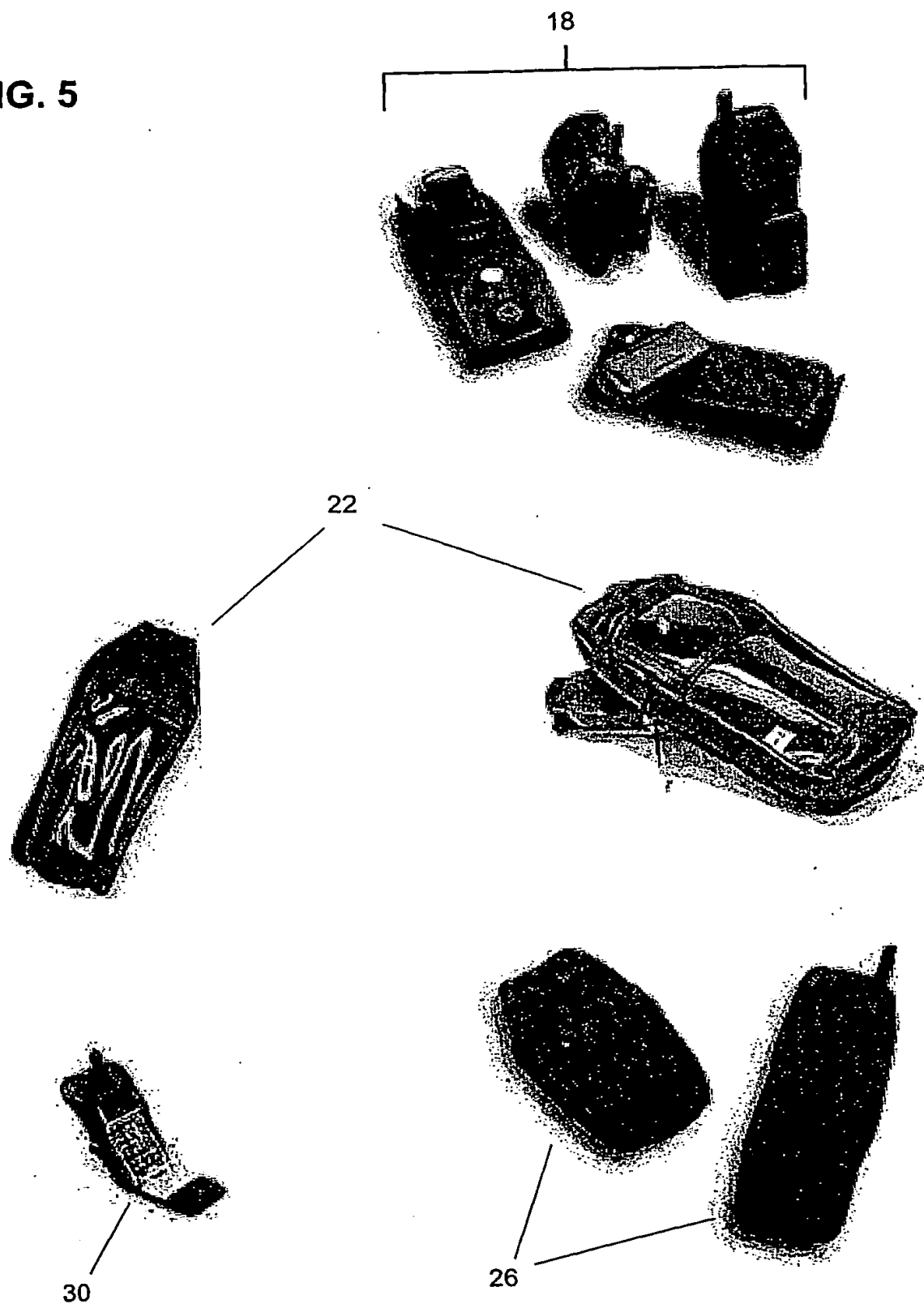
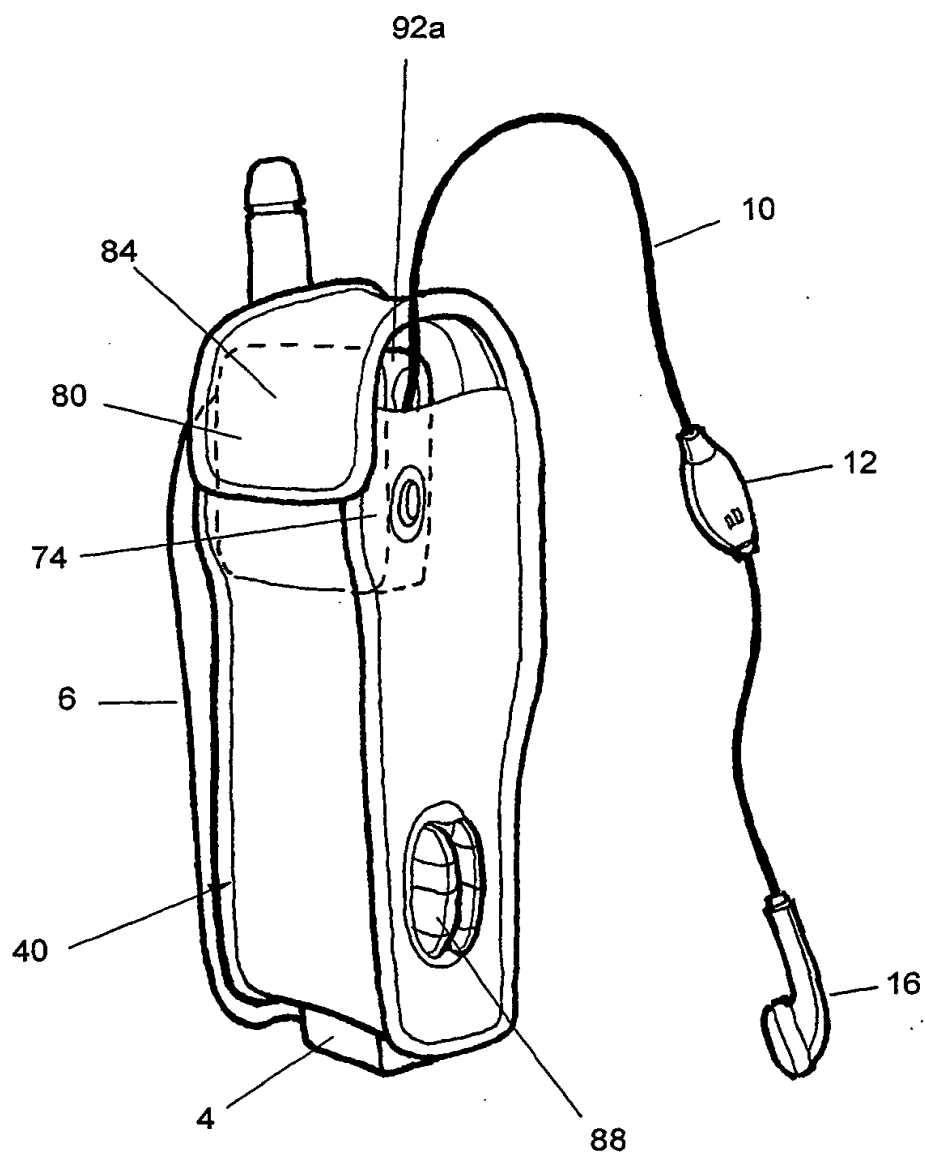
**FIG. 4**

FIG. 5



**FIG. 6**

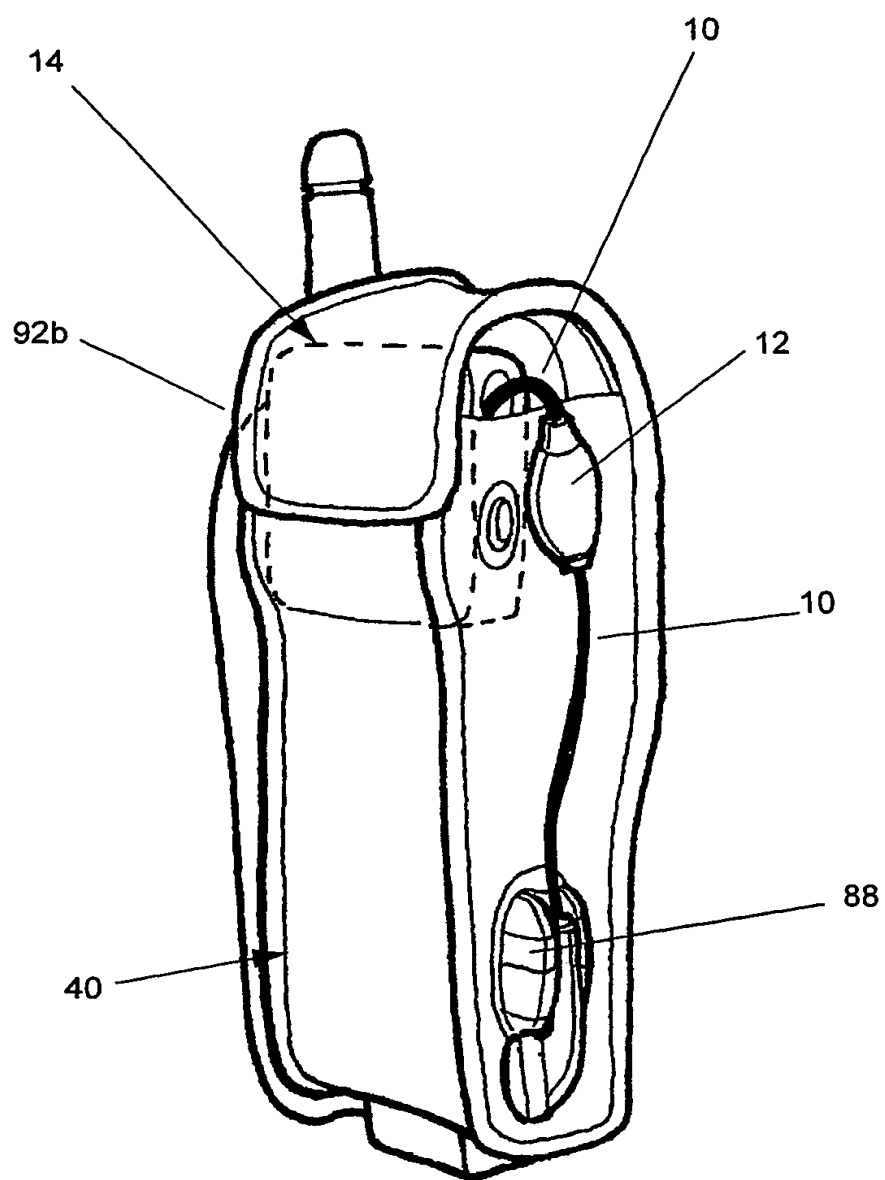
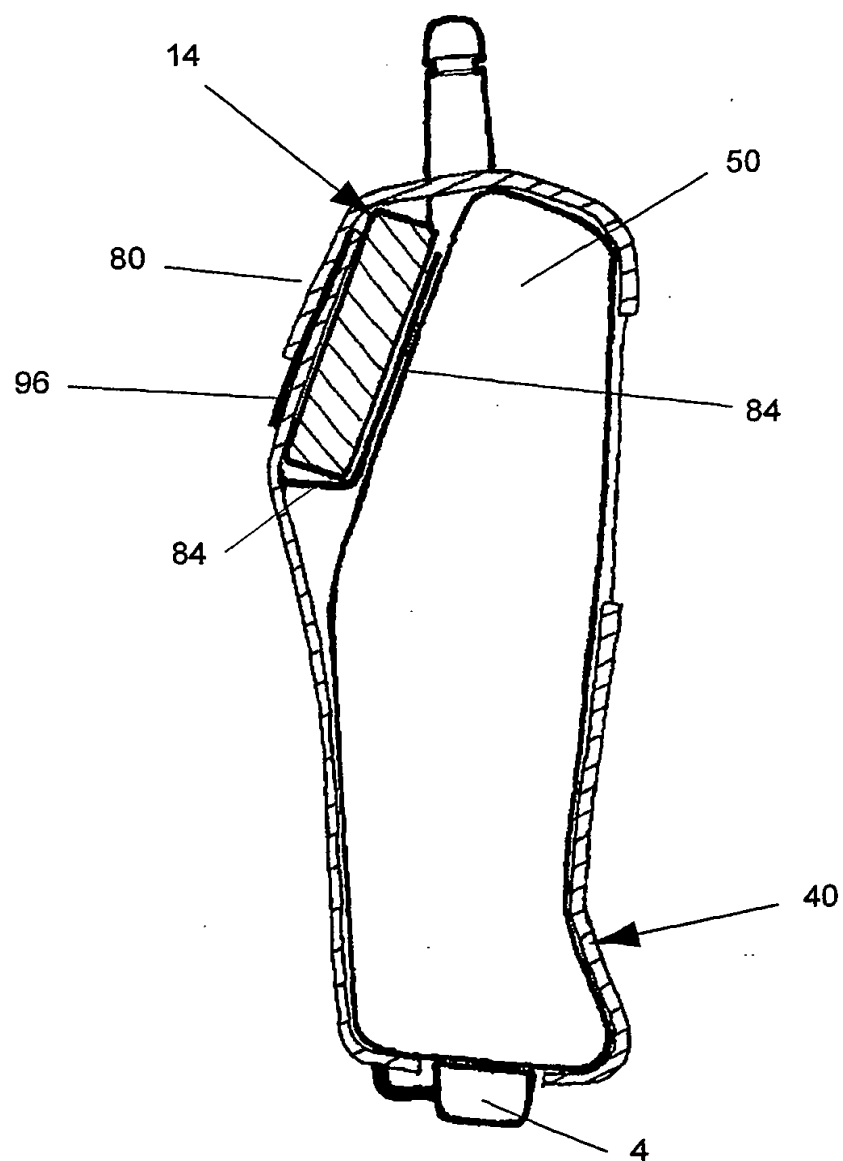


FIG. 7

**FIG. 8**

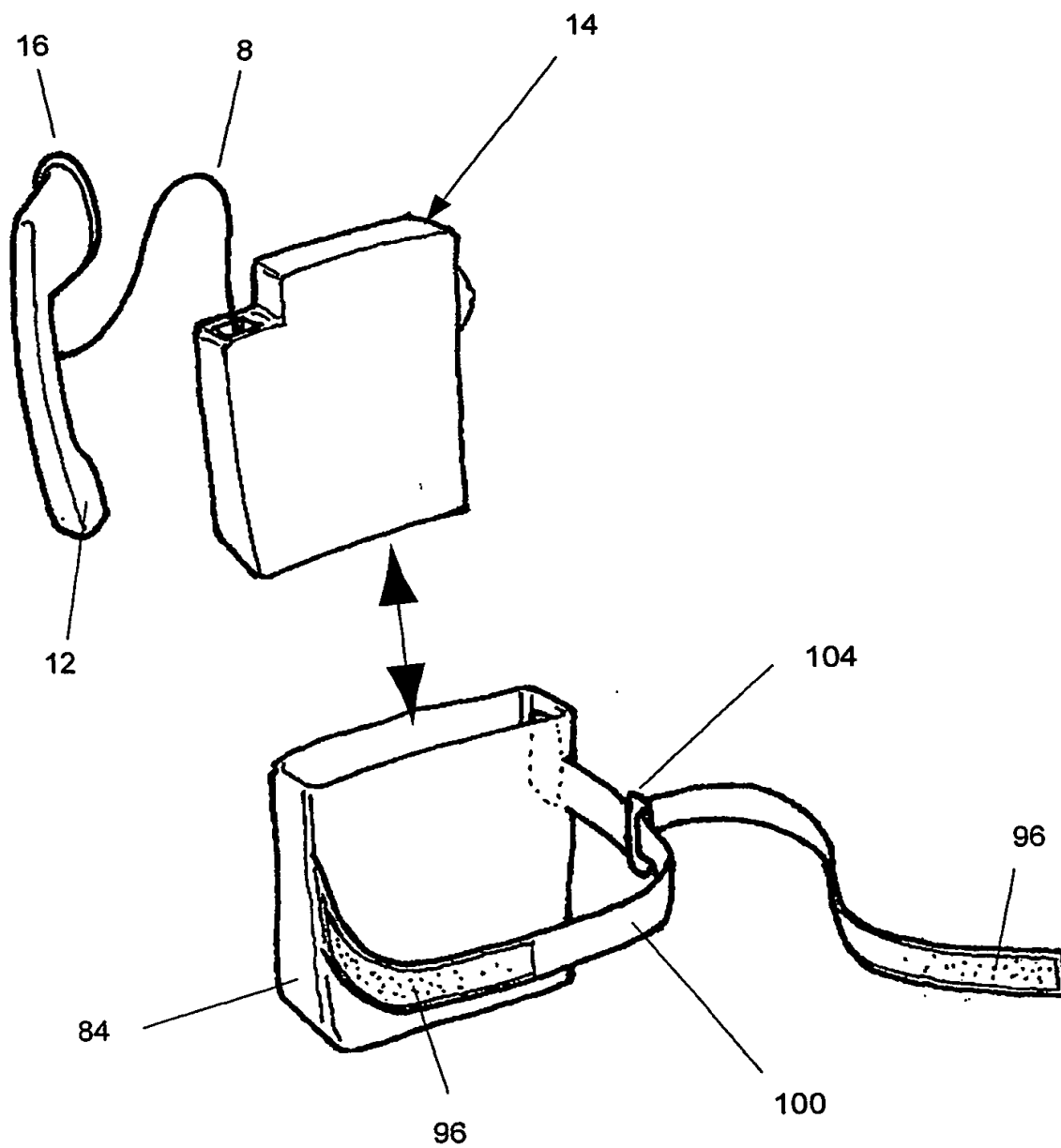


FIG. 9

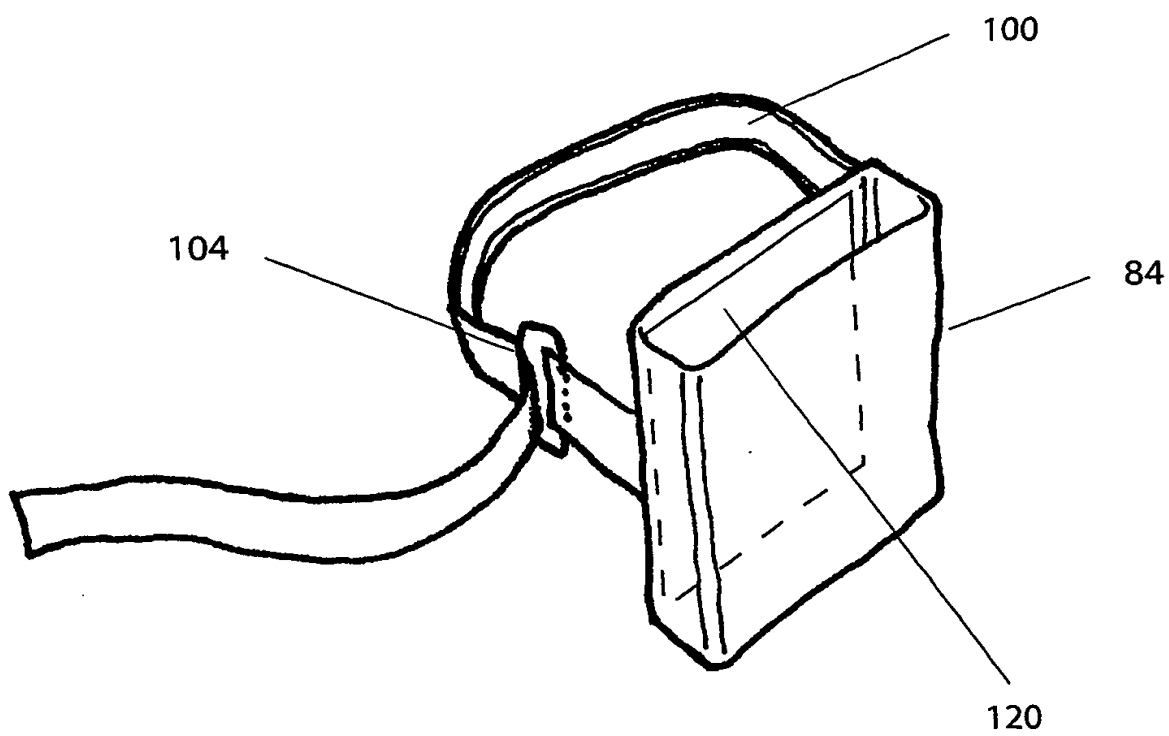


FIG. 10

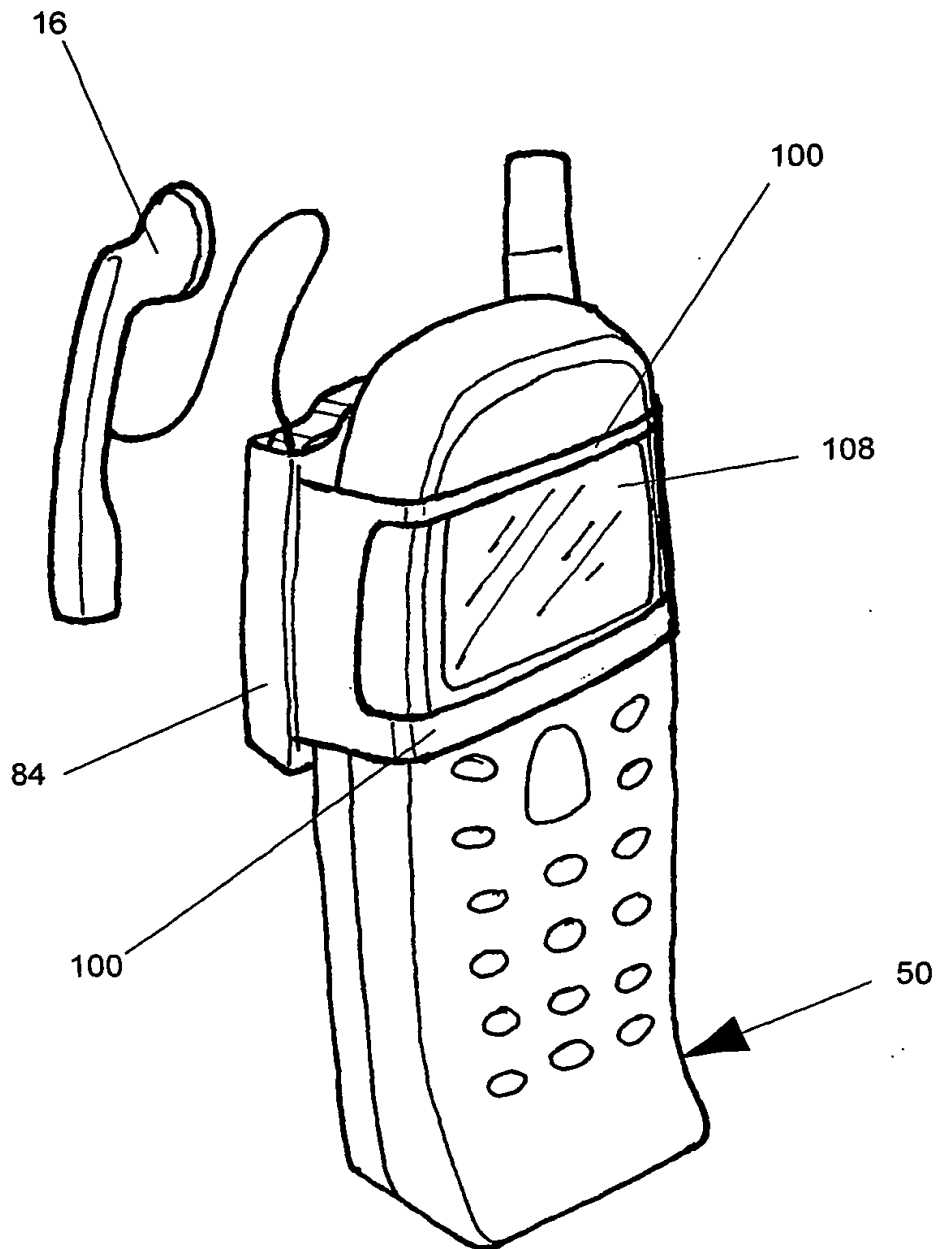


FIG. 11

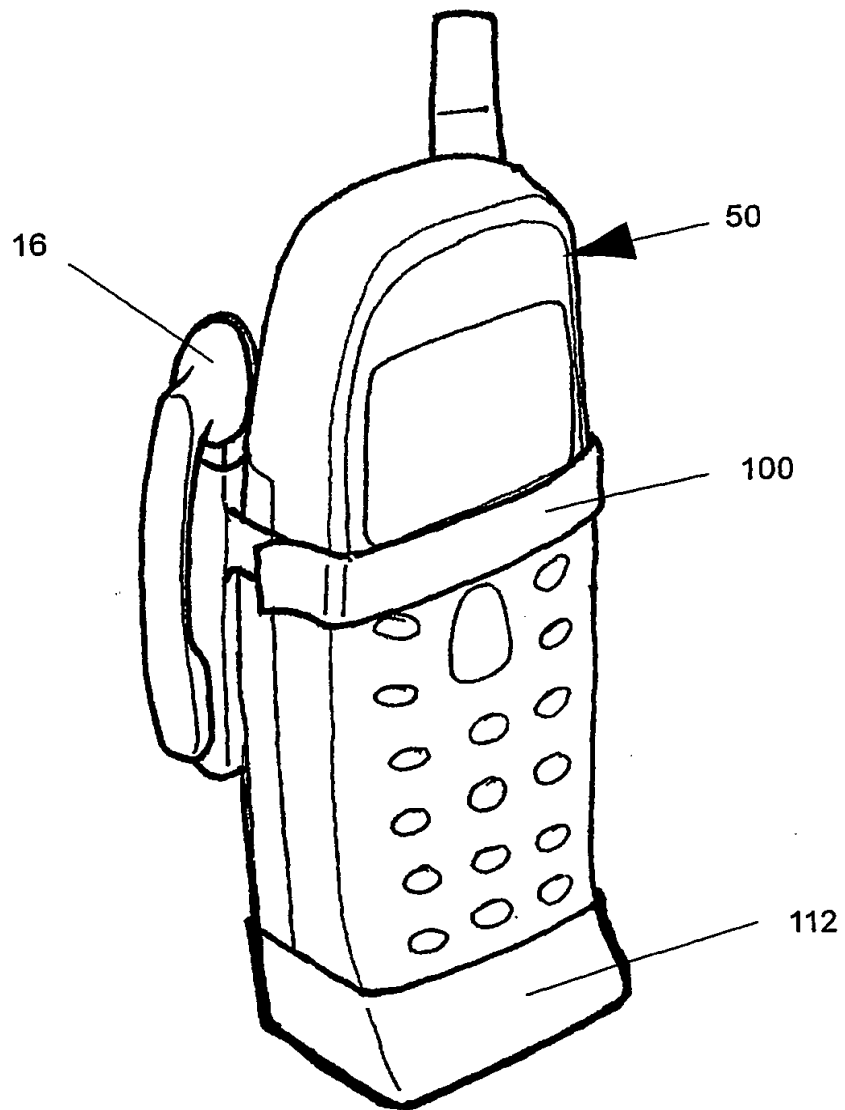


FIG. 12

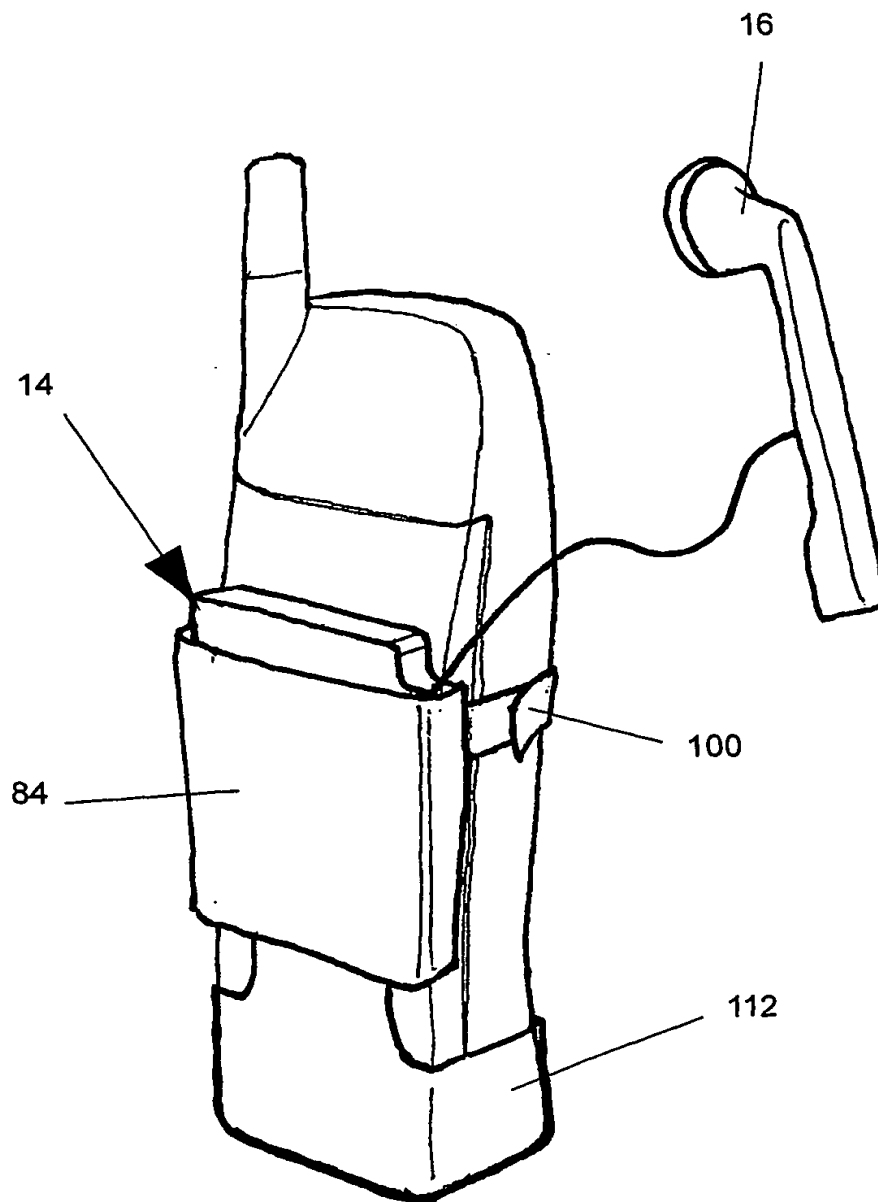


FIG. 13

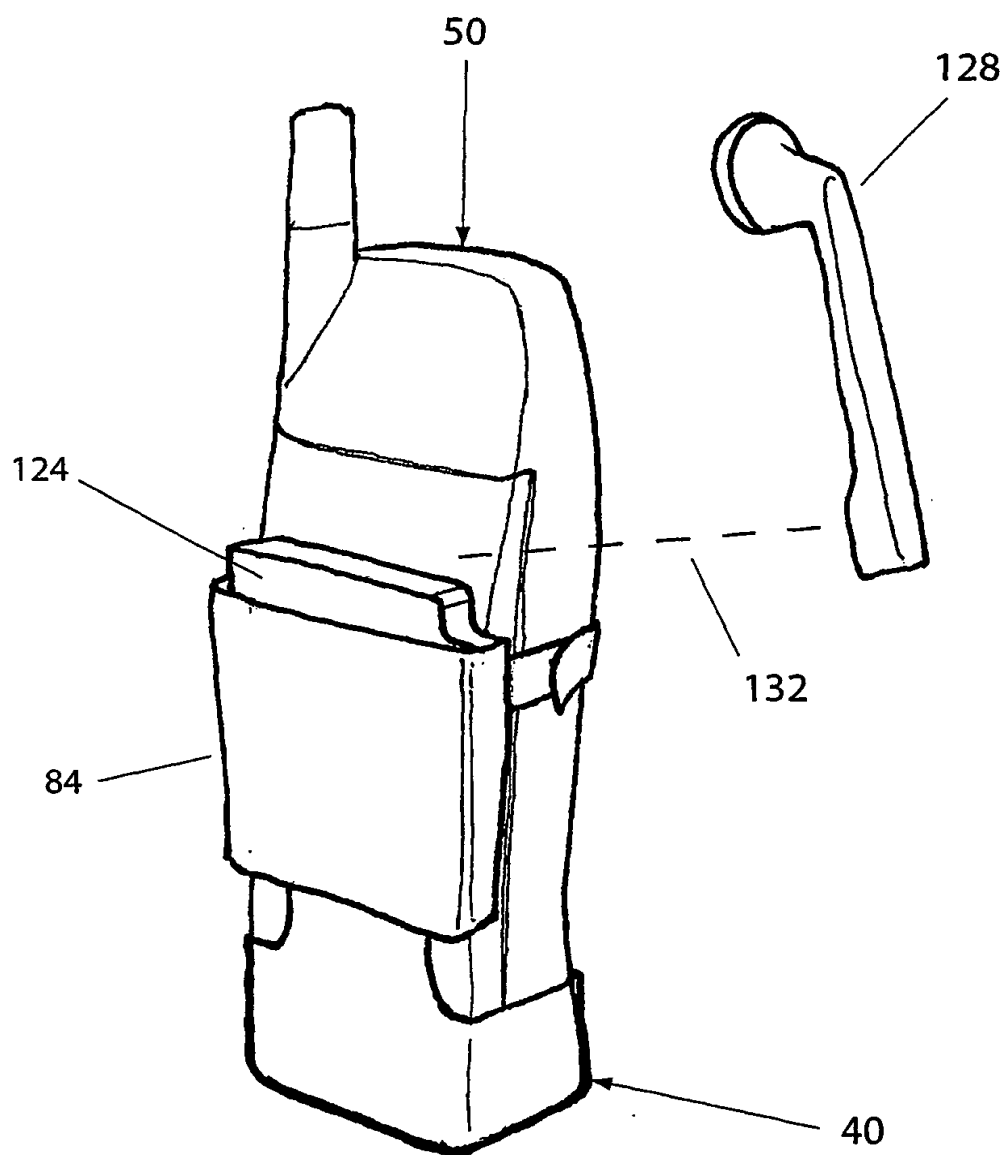


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/07184

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04M 1/00

US CL : 379/430, 438, 446

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/430, 438, 446, 454, 455, 420; 224/151, 148, 901

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
noneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 5,240,156 A (SICOTTE et al.) 31 August 1993, col. 4, lines 61-68, col. 6, lines 3-5.	1-10 — 11-20
X — Y	US 5,388,155 A (SMITH) 07 February 1995, col. 6, lines 26-42.	1-10 — 11-20

☐

Further documents are listed in the continuation of Box C.

☐

See patent family annex.

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